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EUROPEAN PATENT APPLICATION

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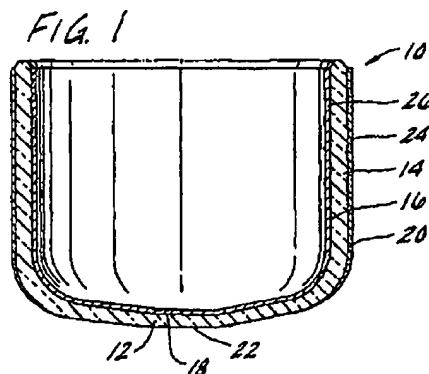
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(54) Crucible for improved zero dislocation single crystal growth

(57) A crucible in which a semiconductor material is melted and held during a crystal growing process. The crucible includes a body of vitreous silica having a bottom wall and a sidewall formation extending up from the bottom wall and defining a cavity for holding the molten semiconductor material. The sidewall formation has an inner and an outer surface. A first devitrification promoter on the inner surface of the sidewall formation is distributed such that a first layer of substantially devitrified silica is formed on the inner surface of the crucible which is in contact with the molten semiconductor material when the semiconductor material is melted in the crucible during the crystal growing process. A second devitrification promoter on the outer surface of the sidewall formation is distributed such that a second layer of substantially devitrified silica is formed on the outer surface of the crucible when the semiconductor material is melted in the crucible during the crystal growing process. The first substantially devitrified silica layer is such that it promotes uniform dissolution of the inner surface and in so doing significantly reduces the release of crystalline silica particulates into the molten semiconductor material as a crystal is pulled from the molten semiconductor material. The second substantially devitrified silica layer is such that it reinforces the vitreous silica body.



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European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 30 4342

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X	WO-A-94 24505 (QUARTZ & SILICE ;BALIAN PIERRE (FR); RIMLINGER SERGE (FR); TROUVÉ) 27 October 1994 * page 1, line 9 - page 9, line 24 *	1-3,6, 11,12	C30B15/10
X,D	US-A-4 102 666 (BAUMLER PETER ET AL) 25 July 1978 * column 3, line 43 - column 8, line 86 *	1,4,7, 11,12	
X	DE-A-19 59 392 (WACKER CHEMITRONIC GMBH-ELEK) 3 June 1971 * claims 1,3 *	1-3	
A	EP-A-0 463 543 (SHINETSU QUARTZ PROD) 2 January 1992 * claim 1 *	13	
A	US-A-5 053 359 (LOXLEY TED A ET AL) 1 October 1991 * abstract *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			C30B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		13 September 1996	Flink, E
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>Y : theory or principle underlying the invention K : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons * : member of the same patent family, corresponding document</p>			

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XP-002251919

AN - 1988-319477 [45]
AP - JP19870070214 19870326; JP19870070214 19870326; [Based on J63236723]
CPY - SHIN-N
DC - E36 L01 L03 U11
DR - 1666-P 1694-U
FS - CPI;EPI
IC - C03B20/00 ; C30B15/10 ; C30B35/00 ; H01L21/22
MC - E31-P06A L01-A05 L04-D05
- U11-C02A1
M3 - [01] B114 C810 M411 M720 M903 M904 M910 N104 Q452 Q454; R01666-P;
3102-R 1678-D
PA - (SHIN-N) SHIN-ETSU SEKIEI KK
PN - JP63236723 A 19881003 DW198845 004pp
- JP6008181B B2 19940202 DW199408 C03B20/00 000pp
PR - JP19870070214 19870326
XA - C1988-141160
XIC - C03B-020/00 ; C30B-015/10 ; C30B-035/00 ; H01L-021/22
XP - N1988-242260
AB - J63236723 On the outer surface of the glass prods. contg. 0.2- ppm or less each of Na and K, and OH content 10 ppm or less, is formed a cristobalite crystalline layer using doped impurity as crystallisation nucleus. Opt. the impurity is a trivalent cation. Opt. the cristobalite layer is 10-100 microns thick from the surface.
- USE - For furnace core tubes and crucibles for Si growing single crystals.
- In an example, natural quartz powder was immersed in HF melt in an electric furnace for 10-12 hrs. to obtain prod. contg. 10 ppm or less OH, moulded into a furnace core tube, and heated under (H)Cl gas flow to control Na and K contents to 0.1 ppm or less for each, and Li to 0.3 ppm. An aq. soln. contg. Al ion was coated on the surface of the tube, and heated at 1300 deg.C. for 10-15 hrs. to give a cristobalite layer 10-100 microns thick covering the entire surface of the tube.(0/1)
CN - R01666-P
DRL - 3102-R 1678-D
IW - QUARTZ GLASS PRODUCT SINGLE CRYSTAL GROW CRUCIBLE OUTER SURFACE CRISTOBALITE CRYSTAL
IKW - QUARTZ GLASS PRODUCT SINGLE CRYSTAL GROW CRUCIBLE OUTER SURFACE CRISTOBALITE CRYSTAL
NC - 001
OPD - 1987-03-26
ORD - 1988-10-03
PAW - (SHIN-N) SHIN-ETSU SEKIEI KK
TI - Quartz glass products for single crystal growing crucibles, etc. - have outer surface of cristobalite crystals

INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichung

zur selben Patentfamilie gehören

In es Abkürzungen

PCT/EP 02/02395

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